REMARKS

The original specification and the original claims are amended in accordance with the original specification, the original claims and the original drawings.

No new matter is raised.

OBJECTION TO SPECIFICATION

The specification is objected to because of the following informalities:

(a) The abstract of the disclosure contains more than 150 words.

(b) The specification uses the word – consult – on numerous occasions in an awkward and nuclear manner.

(c) The specification refers to non-exist Figure number.

(d) The entire specification contains improper idiomatic English.

Applicant respectfully traverses this objection.

First, the abstract of the disclosure is rewritten to contain less than 150 words.

Second, the word – consult – is thoroughly replaced with other wording.

Third, the non-exist Figure number is replaced with the correct Figure number.

Finally, the specification is amended to avoid the usage of improper English.

OBJECTION TO CLAIMS

Claims 2, 9, 10 are objected to because of the following informalities:

(a) The phrase – in according to – of claim 2 is awkward.

(b) The phrase – to let a last square error between said failure rate testing time relation and said testing time function is minimized- and - to let an error between said failure rate testing time relation and said testing time function is minimized – is awkward.

Applicant respectfully traverses this objection.

First, - in according to – is replaced by – in accordance with --.

Second, the sentences of claims 2, 9 and 10 are amended.

CLAIM REJECTIONS – 35 U.S.C. SECTION 112(2)

Claims 1-20 are rejected under 35 U.S.C. 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 12, and 19 (and dependent claims 2-11, 13-18 and 20) are rejected for the word "consulted". Claim 9 is rejected for the words "a last square error". Claims 11, 18 and 20 are rejected for the words "while said testing time in which is corresponded by said testing time". And Claim 19 is rejected for the words "performing an optimizating process".

Applicant respectfully traverses this rejection.

First, the word "consult" is thoroughly replaced with other wording.

Second, the words "a last square error" are replaced by the word "least squares".

Third, the sentences of claims 11, 18 and 20 are amended.

Finally, the word "optimizating" is replaced by the word "optimizing".

CLAIMS REJECTIONS – 35 U.S.C. SECTION 103(a)

The Examiner rejected Claims 1-20 under 35 U.S.C. 103(a) as being unpatentable over Boyington et al. (Hereinafter Boyington) (U.S. 6,377,897),Chien et al. (Hereinafter Chien) (IEEE TRANSACTIONS ON SEMICONDUCTOR MANUFACTURE MANUFACTURING VOL. 9 N0. 3 AUGUSE 1996 pp. 461-467) and Matsuoka (U.S. 5,204,616),

By at least referring to the following parts of Boyington: col. 3 lines 16-29, col. 3 lines 31-33, col. 3 lines 40-47, col. 3 line 61 to col. 4 line 8, col. 4 lines 8-29, col. 4 lines 39-46, and Fig. 3, the Examiner considers that Boyington discloses most of claims 1-20. The Examiner considers that Boyington does not disclose the following parts of claims 1-20: the step of simulating a failure rate testing time relation, or the step of simulating a failure rate real time relation,

However, by at least referring to pages 462-463 of Chien, and by referring to col. 1 lines 21-28 and co. 3 lines 10-38 of Matsuoka, the Examiner considers that Chien and Matsuoka disclose all of these parts

of claims 1-20 that Boyington never discloses. Therefore, the Examiner considers that claims 1-20 could be easily acquired by referring to Boyington in view of Chien and/or Matsuoka.

Applicant respectfully traverses this rejection.

Initially, applicant emphasizes that the purpose of the invention is to overcome the following conventional disadvantages: (1) the difference between the experimental value and the theoretical value cannot be found by the used formula; (2) the best burn-in time only can be acquired by experience or formula, it cannot be acquired by the relation between the best burn-in time and the corresponding risk; (3) the reliability of produced integrated circuits cannot be promised by ensuring the estimated value is almost the best value in accordance with the comparison between the experimental value and the theoretical value. Please refer to page 3 lines 17-26 of the original specification.

Next, applicant excerpts the scope of the claims as follows:

(a) Perform a stress test to acquire the life distribution of the tested samples.

(b) Perform the "trial and approach" procedure to acquire a stimulated curve, such as the test time function, where the difference between the stimulated curve and the life distributed is minimized.

(c) Transforms the stimulated curve into a real time life distribution by using the acceleration factor of the stress test.

(d) Determine a best Burn-in time by using the real time life distribution, and further calculates some informations such as the reliability of the test samples.

Further, applicant emphasizes the scope of the claims at least has the following characteristics:

(a) No formula or predetermined database is used to acquire the failure rate and the best burn-in time. At most, the stored experimental data are used to determine the period of the stress test.

(b) The stimulated curve is acquired by the "trial and approach" procedure. In other words, the stimulated curve is acquired by repeatedly performing the process until the difference is minimized: establish a curve with some parameters; find the difference between the curve and the life distribution; change the value(s) of at least one parameter(s); find the difference again ... and so on.

(c) Only perform the stress test during a specific period, which means the stress test is only performed once in the invention. After the stress test is performed, the stimulated curve is acquired by the measured results of the stress test.

(d) The acceleration factor function is used to perform the transformation between the testing time and the real time.

(e) The calculation of the stimulated curve at least is calculated for both the infant mortality period and the normal life period. Hence, not only the best burn-in time could be acquired, but also some information,

such as the reliability of the sold products and the average lifetime of the sold product, could be acquired.

To further understand the characteristics of the claimed invention, please at least refer to the following parts of the original specification: page 4 lines 11-41, page 6 lines 12-18, page 7 line 27 to page 8 line 6, page 8 lines 12-16 and lines 22-26, and page 10 line 3 to page 11 line 11.

In contrast, by carefully analyzing Boyington, applicant summarizes Boyington's invention with the following.

(a) Acquire the core time by historical data.

(b) Perform the stress test during a period which is equal to the core time, which means performing the stress test from "time = 0" to "time = core time".

(c) Analysis of the measured data acquired by the stress test.

(d) Decide whether the slope of the function of both failure rate and time is smaller than a predetermined value during the period of the stress test.

(e) If the answer of (d) is no, perform (a)-(c) again, which means performing the stress test form "time = core time" to "time = 2 multiplies core time"; and

If the answer of (d) is yes, use the specific time, where the slope is just smaller than the predetermined value, to be the best burn-in time.

Herein, refer to the following parts of Boyington: FIG. 2, col. 3 lines16-54, and col. 3 line 61 to col. 4 line 29.

Further, by carefully analyzing Chien, applicant agrees that Chien really presents a stimulation method which eliminates the burn-in time without the usage of parameter(s). However, applicant also finds that Chien has the following characteristics:

(a) Chien only considers how to perform the stimulation by using the time-dependent data. In fact, Chien never considers the transformation between the testing time and the real time.

(b) Chien never uses the acceleration factor function.

Herein, please at least refer to the following parts of Chien: FIG. 1, page 462 (A. U-shape Failure Rate Function), page 466 (V. Examples), and partial pages 463-466 (B. Simulation and D Optimal Burn-In time).

Regarding Matsuoka, applicant does not argue with the Examiner's viewpoint about Matsuoka, but believes that the claims are patentable thereover based on the above-noted differences with Boyington.

Accordingly, by carefully comparing the invention with Boyington, applicant reasonably finds the following important differences:

(a) The invention only performs the stress test once during a specific period, except the measured datas are insufficient. Boyington may perform the stress test several times until the specific time that the slope is smaller than a predetermined value.

Clearly, the times that the stress test is performed is a strong difference.

Moreover, the total periods that the stress test is performed by Boyington must not be smaller than the best burn-in time. In contrast, the invention allows that the period of the performed stress test is smaller than the best burn-in time.

Herein, the difference could be easily found from the pending claims for no loop action being described.

(b) The invention not only calculates the best burn-in time but also calculates the results, such as reliability, in both the infant mortality period and the normal life period. Boyington only calculate the best burn-in time and does nothing about the results in the normal life period. Thus, by referring Boyington, there is no motivation to study the results in the normal period.

Clearly, Boyington only relates to part of the invention.

In contrast, the invention uses the acceleration factor function to transform between the testing time and the real time. Boyington only uses one time scale and never discloses anything about the transformation between difference time scales.

Clearly, Boyington teaches nothing about this part of the invention.

Herein, the difference could be easily found from the pending claims for the acceleration factor function being clearly described.

(d) The invention also relates to both "cost" and "mean residual live". Boyington never discloses anything about these subjects.

Clearly, Boyington is only related to part of the invention.

(e) The invention uses a simulated curve to fit the measured data of the performed stress test, and limits the differences between the simulated curve and the measured data to be minimized. Boyington directly uses the measured data to find the slopes without any simulation, and no minimizing difference process is performed.

Clearly, Boyington is only related to part of the invention.

Therefore, applicant emphasizes that the differences between the pending claims and Boyington are much greater than what the Examiner considered.

Furthermore, applicant emphasizes that the Examiner's viewpoint about Chien is also incorrect. For example, Chien never discloses the item "acceleration factor function". Hence, because the Examiner only uses Matsuoka to reject claims 19-20, the differences between claims 1-18 and Boyington are more than what Chien discloses.

Besides, applicant emphasizes that the scope of claims 19-20 is the combination of optimizing process and the scope of claims 1-18, which could be easily found by comparing claims 19-20 with claims 1-18. Hence, while Matsuoka is related to a monitored burn-in system and discloses nothing about the details of the optimizing process, claims 19-20 are strongly different from the combination of Boyington, Chien and Matsuoka.

In short, according to the previous discussions, Applicant emphasizes that the pending Claims 1-20 overcome the formal

objections and rejections, and are not rejectable under 35 U.S.C. 103(a).

In summary, reconsideration and withdrawal of the Examiner's rejection under 35 U.S.C. 103(a) is respectfully requested.

CONCLUSION

In light of the above amendments and remarks, Applicant respectfully submits that all pending Claims as currently presented are in condition for allowance. Accordingly, reconsideration of the present application and withdrawal of the rejections are respectfully requested.

MARKED-UP CHANGES

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached paper is captioned **"VERSION WITH MARKING TO SHOW CHANGES MADE"**

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to

Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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VERSION WITH MARKING TO SHOW CHANGES MADE

(USSN 09/742,224)

IN THE SPECIFICATION:

Please amend the paragraph beginning at line 20 of page 2 as follows:

However, owing to limitation of time, it is impossible for the quality department to test all produced integrated circuits through both the infant mortality period and the normal life period, even only through the infant mortality period. As usual, the quality department only perform a stress test, or called as accelerated test, to test produced integrated circuits through a specific period under a testing environment in which is more harmful and danger for tested integrated circuits, and then the relation between the failure rate and testing time is measured. Then, in accordance with the difference between [the difference between] the testing environment and a normal operating environment to estimate the relation between failure rate and real time, in which is the experienced time under the normal environment.

Please amend the paragraph beginning at line 5 of page 3 as follows:

Indisputably, how to properly and correctly transform the failure rate testing time relation into the failure rate real time relation, is the key about whether failure rate time relation can be properly [consulted] acquired by the stress test.

Please amend the paragraph beginning at line 17 of page 3 as follows:

Significantly, because the failure rate time relation is [consulted] acquired by referring to the formula in accordance with testing records, well-known arts can not avoid following disadvantages: (1) the difference between the experimental value and the theoretical value can not be found by the used formula; (2) the best burn-in time only can be [consulted] acquired by experience or formula, it can not be [consulted] acquired by the relation between the best burn-in time and the corresponding risk; (3) the reliability of produced integrated circuits can not be promised by ensuring the estimated value is almost the best value in accordance with the comparison between the experimental value and the theoretical value.

Please amend the paragraph beginning at line 17 of page 4 as follows:

On the whole, one method present by the invention at least includes following basic steps: Method for determining failure rate and selecting a best burn-in time, comprising: provide numerous integrate circuits; performs a life-time testing process, wherein a failure rate testing time relation is established by measuring the life-time of each integrated circuit under a testing environment, wherein an acceleration factor function also is established under the testing environment, the acceleration factor function is related to the relationship between a testing time of the testing environment and a real time of a normal operating environment; performs a simulating process that a testing time function is used to simulate the failure rate testing time relation; performs a transforming process by using the acceleration factor function to transform the testing time function into a real time function, wherein a knee point of the real time function corresponds to an operation time which is the best burn-in time; and performs an integrating process to integrate the real time function through a calculating region to [consult] acquire an accumulated failure rate real time function, wherein the calculating region is a region in which the real time is larger than the best burn-in time.

Please amend the paragraph beginning at line 12 of page 6 as follows:

One major disadvantage of conventional arts is that values of part used parameters and values of part used functions, such as chi square function, are [consulted] acquired from some pre-established tables, especially same pre-determined tables are used to analysis different testing records of different samples. It is indisputable that some external variables, which are not [consulted] acquired from testing records, are used to calculate the failure rate time relation, and then the failure rate time relation can not be obtained only by testing records. Aims on previous discussion, the claimed invention presents a way to estimate the failure rate time relation only in accordance with testing records, and then only errors induced by estimating process will be an issue but errors induced by external variables will not be an issue.

Please amend the paragraph beginning at line 25 of page 7 as follows:

As simulating block 23 shows, performs a simulating process that uses a testing time function to simulate the failure rate testing time relation. Whereby, the simulating process is adjusted to let [an error] a difference, such as [last square error] least squares, between the failure rate testing time relation and the testing time function is minimized. Further, the testing time function is a function of testing time. Moreover, because usually only the infant mortality period and the normal life period must be considered, and also owing to the hint of FIG. 1, the

testing time function usually is an exponent function, a polynomial of testing time or $y=at^b$, wherein a and b are two variables, y is the failure rate and t is the testing time.

Please amend the paragraph beginning at line 18 of page 8 as follows:

As integrating block 25 shows, performs an integrating process that integrates the real time function through a calculating region to [consult] acquire an accumulated failure rate real time function. Whereby, the calculating region is a region in which the real time is larger than the best burn-in time. Certainly, because integrated circuits usually never are used to the wear out period, it is reasonable that integrating process is stopped while said testing time in which is corresponds by said testing time is located in said wear out period, and then result of the integrating process is the accumulated failure rate during the normal life period.

Please amend the paragraph beginning at line 25 of page 9 as follows:

As integrating block 35 shows, performing an integrating process by integrating the real time function through a calculating region to [consult] acquire an accumulated failure rate real time function.

Whereby the calculating region is a region in which real time is larger than the best burn-in time.

Please amend the paragraph beginning at line 23 of page 10 as follows:

Obviously, because the claimed invention never uses any mathematical formula [also] and never uses any external parameter which is not [consulted] acquired from the testing records, and also because the claimed invention is a numerical approach method, it is reasonable that the claimed invention can decide the error range by ["try and error"] "trial and approach" and also can decide the precision of the [consulted] acquired accumulated failure rate real time function.

Please amend the paragraph beginning at line 21 of page 11 as follows:

For example, while the failure rate time relation is as shown in FIG. 4A that the curve is formed by following testing records 6H-12H-18H ...and so on, it is obviously that 12H, the second testing record, is a good knee point and no other obvious knee point is existent, and then the required time function can be [consulted] acquired from following testing records 6H-12H-23H ...and so on. However, while the failure rate time relation is as shown in FIG. 4B that curve is formed by

6H-12H-18H-24H(knee point)-30H... and so on, or while the failure rate time relation is as shown in FIG. 4C that curve is formed by 6H-12H-18H(near knee point)-24H(near knee point)-30H...and so on, it is necessary to delete the first few testing records, for example deleting the 6H and 12H for FIG. 4C and deleting 6H for [FIG. 4D] FIG. 4B, to let the knee point is the second used testing recorded. And the time function is calculated while the knee point is properly selected.

Please amend the paragraph beginning at line 13 of page 11 as follows:

Next, while more than one integrated circuits are failed before a specific testing time in which is corresponding to the knee point, it usually is necessary to perform an [optimizating] optimizing process that deletes part of testing records and performs corresponding processes. While only one integrated circuit is failed before a specific testing time in which is corresponding to the knee point, the specific testing time is a best testing time of these integrated circuits.

IN THE CLAIMS:

Please amend claim 1 as follows:

1. (Amended) A method for determining failure rate and selecting a best burn-in time, comprising:

providing a plurality of integrate circuits;

performing a life-time testing process, wherein a failure rate testing time relation is established by measuring the life-time of each said integrated circuit under a testing environment, wherein an acceleration factor function also is established under said testing environment, said acceleration factor function being related to the relationship between a testing time of said testing environment and a real time of a normal operating environment;

performing a simulating process, using a testing time function to simulate said failure rate testing time relation;

performing a transforming process, using said acceleration factor function to transform said testing time function into a real time function, wherein a knee point of said real time function corresponds to an operation time which is said best burn-in time; and

performing an integrating process, integrating said real time function through a calculating region to [consult] <u>acquire</u> an accumulated failure rate real time function, wherein said calculating region is a region in which said real time is larger than said best burn-in time.

Please amend claim 2 as follows:

2. (Amended) The method of claim 1, wherein said failure rate testing time relation is divided into three periods in [according to]

accordance with value of said testing time, said three periods are a infant mortality period, a normal life period and a wear out period.

Please amend claim 9 as follows:

9. (Amended) The method of claim 1, wherein said simulating process is adjusted to [let a last square error] minimize the least squares between said failure rate testing time relation and said testing time function [is minimized].

Please amend claim 10 as follows:

10. (Amended) The method of claim 1, wherein said simulating process is adjusted to [let an error] minimize the difference between said failure rate testing time relation and said testing time function [is minimized].

Please amend claim 11 as follows:

11. (Amended) The method of claim 2, wherein said integrating process is stopped while said testing time [in which is corresponds by said testing time] is located in said wear out period, said testing time being corresponding to said real time.

Please amend claim 12 as follows:

12. (Amended) A method for determining failure rate and selecting best burn-in time, comprising:

providing a plurality of integrate circuits;

performing a life-time testing process, wherein a failure rate testing time relation is established by measuring the life-time of each said integrated circuit under a testing environment, wherein an acceleration factor function also is established under said testing environment, said acceleration factor function being related to the relationship between a testing time of said testing environment and a real time of a normal operating environment;

performing a transforming process, using said acceleration factor function to transform said failure rate testing time function into a failure rate real time function,

performing a simulating process, using a real time function to simulate said failure rate real time relation, wherein a knee point of said real time function corresponds to an operation time which is a best burn-in time for testing said integrated circuits; and

performing an integrating process, integrating said real time function through a calculating region to [consult] acquire an accumulated failure rate real time function, wherein said calculating region is a region in which said real time is larger than said best burn-in time.

Please amend claim 16 as follows:

16. (Amended) The method of claim 12, wherein said simulating process is adjusted to [let a last square error] minimize the difference between said failure rate real time relation and said real time function [is minimized].

Please amend claim 18 as follows:

18. (Amended) The method of claim 13, wherein said integrating process is stopped while said testing time [in which is corresponds by said testing time] is located in said wear out period, said testing time being corresponding to said real time.

Please amend claim 19 as follows:

19. (Amended) A method for determining failure rate and selecting best burn-in time, comprising:

providing a plurality of integrate circuits;

performing a life-time testing process, wherein the life-time of each said integrated circuit is measured under a testing environment and then a failure rate testing time relation is established in accordance with a plurality of testing records, wherein an acceleration factor function also is established under said testing environment, said acceleration factor function being related to the relationship between a testing time of said testing environments and a real time of a normal operating environment;

performing a simulating process, using a testing time polynomial of said testing time to simulate said failure rate testing time relation;

performing an [optimizating] optimizing process, part of said testing records are deleted and said corresponding processes are performed again while more than one said integrated circuits are failed before a specific testing time in which is corresponding to a knee point of said testing time polynomial, and said specific testing time is a best

testing time of said integrated circuits while only one of said integrated circuits is failed before said specific testing time;

performing a transforming process, using said acceleration factor function to transform said specific testing time into a specific real time and also transform said testing time polynomial into a real time polynomial, wherein said specific real time is a best burn-in time for testing said integrated circuits; and

performing an integrating process, integrating said real time function through a calculating region to [consult] acquire an accumulated failure rate real time function, wherein said calculating region is a region in which said real time is larger than said best burn-in time.

Please amend claim 20 as follows:

20. (Amended) The method of claim 19, wherein said integrating process is stopped while said testing time [in which is corresponds by said testing time] is located in said wear out period, said testing time being corresponding to said real time.

IN THE ABSTRACT:

Please delete the Abstract and substitute therefor the following new Abstract:

[Method for determining failure rate and selecting a best burn-in time, comprising] The invention comprises the following steps: provide numerous integrate circuits; performs a life-time testing process, wherein a failure rate testing time relation is established by measuring the life-time of each integrated circuit under a testing environment, wherein an acceleration factor function [also] is established under the testing environment[, the acceleration factor function is related to the relationship between a testing time of the testing environment and a real time of a normal operating environment]; performs a simulating process that a testing time function is used to simulate the failure rate testing time relation; performs a transforming process by using the acceleration factor function to transform the testing time function into a real time function, wherein a knee point of the real time function corresponds to [an operation time which is] the best burn-in time; and performs an integrating process to integrate the real time function through a calculating region to [consult] acquire an accumulated failure rate real time function, wherein the calculating region is a region in which the real time is larger than the best burn-in time. [Further, while more than one integrated circuits are failed before the knee point, the method further comprising deleting part of testing records and re-calculating the best burn-in time until only one integrated circuit is fail before the knee point.]